

AMD64 Software Ecosystem

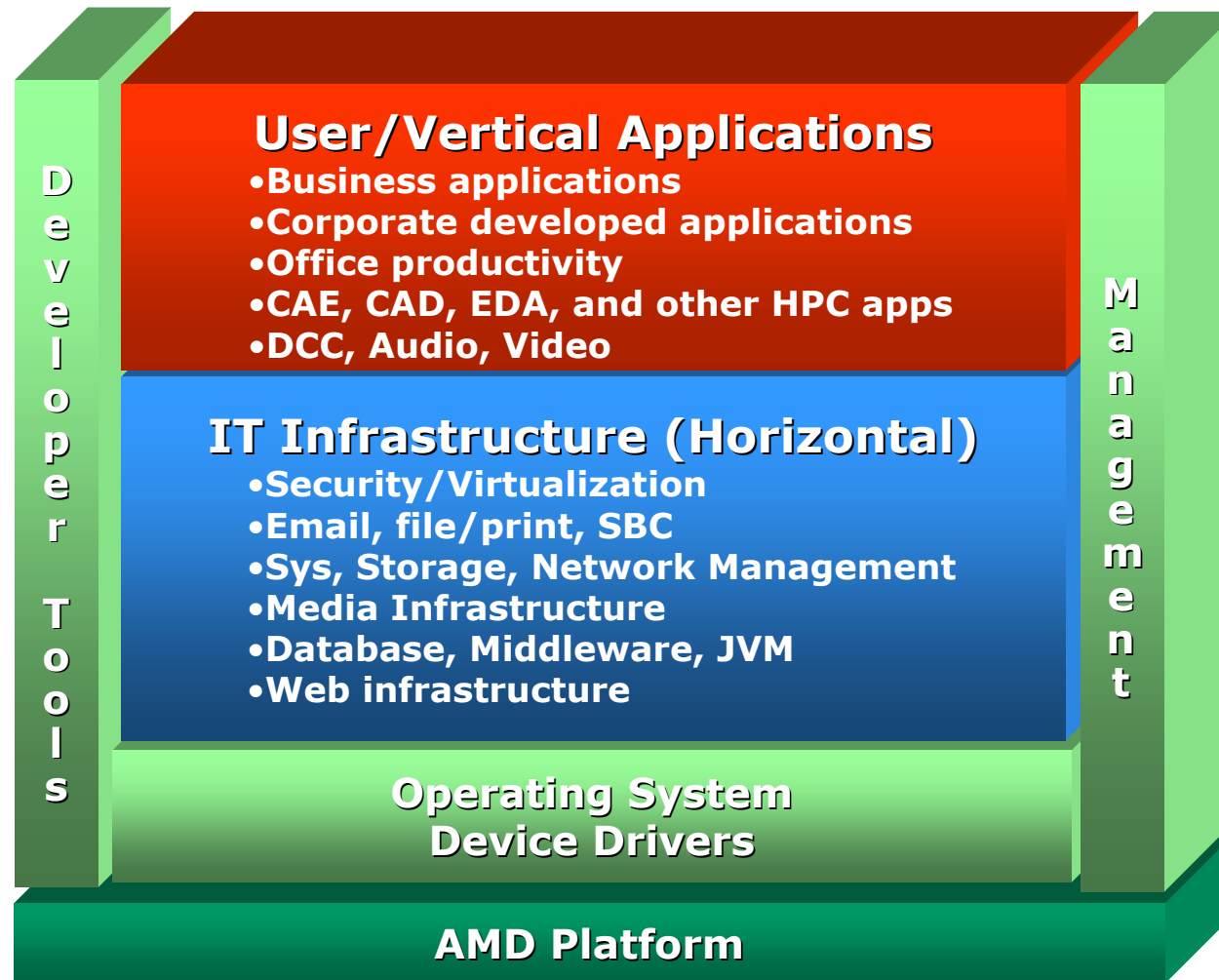
Jay Hiremath
General Manager,
AMD India



AMD Software Objectives

- Ensure a complete software ecosystem is available for commercial, consumer, embedded segments
 - Insure top to bottom solution stacks are available
 - Build engineering, marketing relationships with key ISV's, engage other ISV's through developer programs
 - Drive business issues such as licensing
- Ensure base software foundation is available for AMD64 processor-based platforms
 - BIOS, Operating Systems, Compilers, Java/CLR, XML, Virtualization, Security, System Management, DRM, Multimedia
- Deliver software “reference designs” where appropriate
- Help refine silicon designs based on needs of software

Generalized Software Solution Stack



AMD and Developers

Partners in Development

- Partners in revolutionizing the industry
- Our guiding light to help us out-innovate our competition
- India's developers, just like AMD, have increasing global influence
- Developers continue to be vocal advocates for AMD
- Your success is our success
- AMD's policy on openness and standards – Break Free!



AMD64 Ecosystem

- Visit AMD64 Ecosystem online for the most up-to-date listing of software:

http://developer.amd.com/software_ecosystem.aspx

AMD64 Software Ecosystem Summary

- Thousands of x86-based applications run today on AMD64 processors
- Over 300 ISVs and open source software organizations are actively promoting AMD64 compatibility
- AMD64 processors are driving major O/S ecosystems
 - Microsoft, Novell, Red Hat, Sun
- AMD64 technology is now a key component in software roadmaps
 - Windows® Vista
 - Novell SUSE Linux 10
 - Red Hat Enterprise Linux 5
 - Virtualization software (VMware, Xen, MSFT)

AMD Has Evolved

From Follower to Challenger to Leader

Follower Pre-1997

- Second source for x86
- 286, 386, 486
- Socket compatible

Challenger 1997-2002

- Product leadership
- AMD Athlon™, AMD Athlon XP, and AMD Duron™ processors
- Introduced model numbers reflecting true performance!
- DDR Memory
- First to 1GHz
- AMD-specific infrastructure
- Award-winning fab

Leader 2003 forward

- Architectural leadership with Direct Connect Architecture
- 64-bit processors for the masses – AMD Opteron™ & AMD Athlon 64 processors
- Dual-core architecture
- Linux & Windows® OS for AMD64



Operating System Update

AMD64 Technology Is Driving OS Ecosystems

AMD64 compatible applications are now actively tracked by major OS vendors

- **Windows x64** - Windows Server 2003 x64 application catalog
<http://www.microsoft.com/windowsserver2003/64bit/x64/app64catalog.aspx>
- **Novell SUSE Linux** - Novell Partner Product Guide
<http://www.novell.com/partnerguides/>
- **Red Hat Linux** - Red Hat Software Catalog
AMD support: http://www.redhat.com/apps/isv_catalog/results.html?platform_code=50
AMD64 support: http://www.redhat.com/apps/isv_catalog/results.html?platform_code=110
- **Sun Solaris 10** - Solaris 10 Solutions Guide
<https://iforce.sun.com/partners/10moves/solutions.html>



AMD¹⁰ India Developer Conference, Bangalore May 10, 2006

Development Tools Update

Development Tools - Compilers

Compilers	32-bit Linux	64-bit Linux	32-bit Solaris	64-bit Solaris	32-bit Windows	64-bit Windows
Absoft Fortran Compilers http://www.absoft.com/index2.html	✓	✓			✓	Planned
GNU Compilers http://gcc.gnu.org/	✓	✓	✓		✓	
Lahey/Fujitsu Fortran Compile http://www.lahey.com/	✓				✓	Planned
Microsoft Visual Studio .NET 2003 http://msdn.microsoft.com/vstudio/productinfo/default.aspx					✓	
Microsoft Visual Studio 2005 http://msdn.microsoft.com/vstudio/productinfo/roadmap.aspx#whidbey					✓	✓
NAGWare f95 Compiler http://www.nag.com/nagware/NP/NP_trial.asp	✓	✓			✓	
PathScale EKO Compiler Suite http://www.pathscale.com/products1.html	✓	✓				
PGI Parallel Compilers http://www.pgroup.com/	✓	✓			✓	Beta
Sun One Studio 9 Compiler Collection http://www.sun.com/software/products/studio/index.xml			✓	✓		
Sun One Studio 10 Compiler Collection http://www.sun.com/software/products/studio/s10preview.html			✓	✓		

Development Tools - AMD64 Libraries

- AMD Core Mathematics Library (ACML)
 - Full implementation of Level 1, 2 and 3 Basic Linear Algebra Subroutines (BLAS)
 - Full suite of Linear Algebra (LAPACK) routines
 - A comprehensive suite of Fast Fourier Transforms (FFT), both single-, double-, single-complex and double-complex data types
 - Optimized for AMD64 dual-core technology
- AMD Performance Libraries
 - AMD will help to optimize functions for audio, video, graphics, imaging, speech, cryptography, speech recognition, and signal processing
- IMSL Numerical Libraries
 - Embeddable mathematical and statistical algorithms, written in C, C#, Java™, and Fortran
- NAG Numerical Libraries
 - Largest commercially available collection of numerical and statistical algorithms in the world

Sample Partner Success Stories

Financial Services Case Study: Microsoft Treasury

The Challenge

- Managing \$60 billion of financial assets and the foreign currency exposure of the world's most successful software company
- Reducing portfolio risk by reducing the amount of time required to run its risk analysis software
- Ability to access enough memory to handle all the assets at once



The advertisement features a photograph of a busy financial trading floor with several people working at computer terminals. The AMD logo is in the top right corner. Overlaid on the image is the text: "When Microsoft invests sixty billion dollars, they don't use just any processor." Below this, a text box contains the following information:

64 To manage this much money, you need a solution that offers optimum performance and real-time flexibility. Microsoft found both in the AMD Opteron™ processor running Windows Server™ 2003, Enterprise Edition. The AMD Opteron processor with its Direct Connect Architecture already powers the world's highest performing 2-way and 4-way x86 servers. Now Microsoft Treasury managers are using it to slash the time it takes to run their complex risk-analysis software. Meanwhile, they have the flexibility to go from 32- to 64-bit applications without disrupting their business. At AMD, we believe it's critical that technology should migrate on your terms to help you realize your unique vision. It's one of the reasons why leading OEMs offer enterprise-class solutions powered by AMD Opteron processors. Would you like to learn just how much of a difference they can make to your company? Go to www.amd.com/enterprise

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AMD

Financial Services Case Study: Microsoft Treasury

The Solution

- Windows® Server 2003 x64 Edition
- Minimized implementation impact by adding AMD Opteron™ processor-based servers to the existing computing cluster
- New servers comprised of four-way and two-way AMD Opteron processor-based servers based on AMD64 technology with Direct Connect Architecture
- 32-bit portfolio risk-management software



The advertisement features a photograph of a busy trading floor with several people working at computer terminals. Overlaid on the image is the AMD logo in the top right corner. A large text overlay reads: "When Microsoft invests sixty billion dollars, they don't use just any processor." Below this, a text box contains the following information: "To manage this much money, you need a solution that offers optimum performance and real-time flexibility. Microsoft found both in the AMD Opteron™ processor running Windows Server™ 2003, Enterprise Edition. The AMD Opteron processor with its Direct Connect Architecture already powers the world's highest performing 2-way and 4-way x86 servers. Now Microsoft Treasury managers are using it to slash the time it takes to run their complex risk-analysis software. Meanwhile, they have the flexibility to go from 32- to 64-bit applications without disrupting their business. At AMD, we believe it's critical that technology should migrate on your terms to help you realize your unique vision. It's one of the reasons why leading OEMs offer enterprise-class solutions powered by AMD Opteron processors. Would you like to learn just how much of a difference they can make to your company? Go to www.amd.com/enterprise"

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Financial Services Case Study: Microsoft Treasury

The Impact

- Reduced the amount of time required to run risk analysis software from 40 hours to 13 hours
- 325% increase in overall system performance
- Greater memory utilization resulted in these performance gains for a 32-bit application without having to recompile a single line of code



The advertisement features a photograph of a busy financial trading floor with several people working at computer terminals. The AMD logo is in the top right corner. Overlaid on the image is the text: "When Microsoft invests sixty billion dollars, they don't use just any processor." Below this, a small box contains a paragraph of text. At the bottom, there is a line of fine print.

When Microsoft invests sixty billion dollars, they don't use just any processor.

To manage this much money, you need a solution that offers optimum performance and real-time flexibility. Microsoft found both in the AMD Opteron™ processor running Windows Server™ 2003, Enterprise Edition. The AMD Opteron processor with its Direct Connect Architecture already powers the world's highest performing 2-way and 4-way x86 servers. Now Microsoft Treasury managers are using it to slash the time it takes to run their complex risk-analysis software. Meanwhile, they have the flexibility to go from 32- to 64-bit applications without disrupting their business. At AMD, we believe it's critical that technology should migrate on your terms to help you realize your unique vision. It's one of the reasons why leading OEMs offer enterprise-class solutions powered by AMD Opteron processors. Would you like to learn just how much of a difference they can make to your company? Go to www.amd.com/enterprise

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AMD, HP and Red Hat

TRAVEL INDUSTRY PIONEER REALIZES DRAMATIC PERFORMANCE INCREASES WITH AMD AND RED HAT

Sabre Holdings, an S&P 500 company, has historically been quick to leverage new technologies that have helped it remain at the forefront of the travel industry. A few years ago, the company embarked on an ambitious migration project designed to replace existing systems with more efficient ones. After comparing the features, performance characteristics, and reliability of the AMD Opteron™ processor against many of the other proprietary 64-bit platforms, Sabre ultimately selected more than 70 four-way HP DL585 servers running Red Hat Enterprise Linux 3 to replace their existing systems. “We first decided to look at the AMD Opteron processor in part because it was competitively priced, and our hope was that the processor’s performance would be at least as good as that of our existing systems,” said Craig Murphy, chief technology officer of Sabre Holdings. “However, we were blown away by the performance of the AMD Opteron processor-based DL585, finding that it significantly exceeded our expectations.”

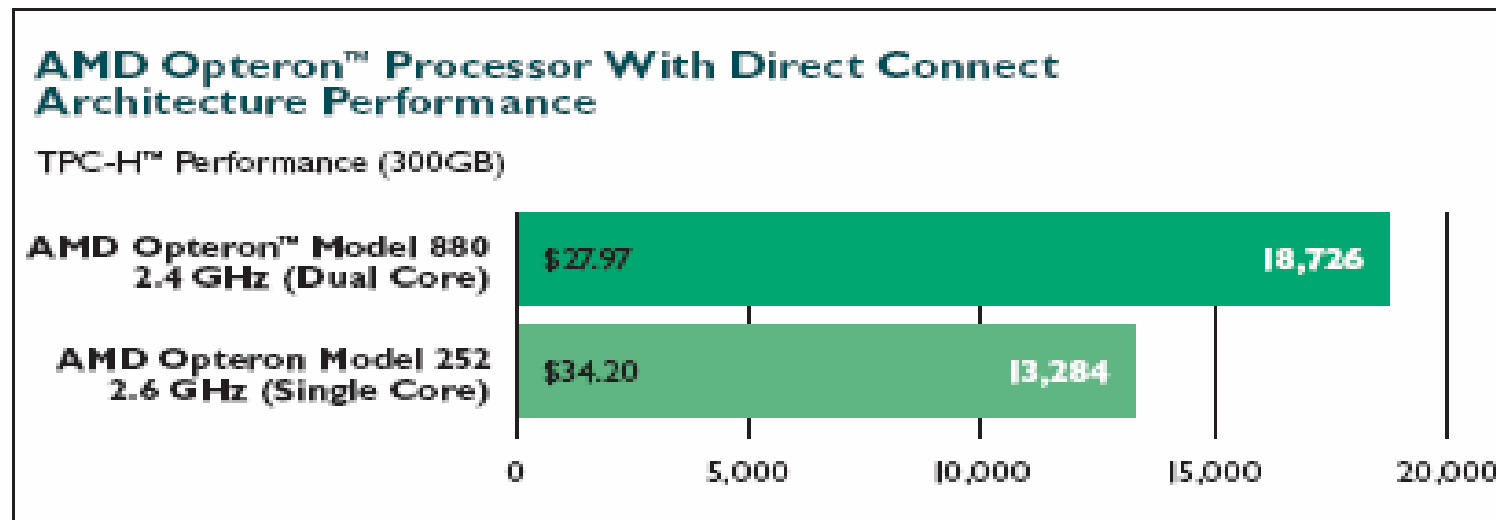
“We were blown away by the performance of the AMD Opteron™ processor-based DL585, finding that it significantly exceeded our expectations.”

— Craig Murphy, chief technology officer, Sabre Holdings, AMD and Red Hat customer



AMD, HP, Oracle and Red Hat






Working in collaboration with HP and Oracle, Red Hat and AMD have achieved several world record TPC (Transaction Processing Performance Council) results, including the TPC/H 300GB benchmark shown below.



8 AMD Opteron™ processors Model 880 in HPBL25p, Red Hat Enterprise Linux 4 ES, Oracle 10g release2 Enterprise Edition. Reference as published 13284 QphH, \$27.97 \$/QphH. http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=105111101 8 AMD Opteron™ processors Model 252 with 1MB L2 cache in HPBL25p, Red Hat Enterprise Linux 4 ES, Oracle 10g release2 Enterprise Edition. Reference as published 13284 QphH, \$34.20 \$/QphH. http://www.tpc.org/tpch/results/tpch_result_detail.asp?id=105091601

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Thank You!